

REMARKS

The present patent application was filed on July 19, 2006 (claiming priority to International Patent Application PCT/IB2003/005129 filed on November 13, 2003 and published in English with Publication No. WO 2004/056470 A1 on July 8, 2004, under PCT article 21(2), which in turn claims priority from European Application No. 02028555.7, filed on December 20, 2002) with claims 1-23. Claim 23 has been withdrawn in response to a previous restriction requirement, Applicants previously canceled claims 2, 3, 15, 16, 18 and 19 without prejudice. Therefore, claims 1, 4-14, 17 and 20-23 are presently pending in the application.

The Office Action alleges that the information disclosure statement filed October 8, 2009 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document. The Office Action also rejects claims 1, 4-7, 9, 10, 14, 17 and 20-22 under 35 U.S.C. §102(b) as allegedly being anticipated by Church (US 6,432,360) (hereinafter "Church"), rejects claim 8 under 35 U.S.C. §103(a) as allegedly being unpatentable over Church in view of Richter et al. (Advanced Materials (2000) 12(7): 507-510) (hereinafter "Richter"), rejects claims 11 and 13 under 35 U.S.C. §103(a) as allegedly being unpatentable over Church in view of Korlach et al. (US 2003/0044781) (hereinafter "Korlach"), and rejects claim 12 under 35 U.S.C. §103(a) as allegedly being unpatentable over Church in view of Mian et al. (US 5,686,271) (hereinafter "Mian").

The comments of the Examiner in forming the rejections are acknowledged and have been carefully considered.

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On page 2, the Office Action states that

the information disclosure statement filed October 8, 2009 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document.... Specifically, a complete copy of the following foreign patent documents does not appear to have been submitted: H10-510158, JP 2002-543847, and JP 2001-519538.... Accordingly, these references have not been considered.

Applicants submit that they are, in response, submitting the published PCT applications corresponding to each of the three references. As such, JP 2001-519538 corresponds with International Publication Number WO 99/19341, JP 2002-543847 corresponds with International Publication Number WO 00/70073, and H10-510158 corresponds with International Publication Number WO 96/17959.

Consequently, Applicants respectfully request withdrawal of the objection.

§102 REJECTION

As highlighted above, the Examiner rejected claims 1, 4-7, 9, 10, 14-17 and 20-22 under 35 U.S.C. §102(b) as allegedly being anticipated by Church.

Applicants initially note that the Office Action dated February 4, 2009 included the same 102 rejection and the same three 103 rejections as raised in the present Action. In response to the February 4, 2009 Action, Applicants amended independent claim 1, causing the final step of the claim to read “self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer on a flat surface, wherein self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer comprises producing a homogeneous area, wherein the homogeneous area comprises a monolayer of molecules on the surface, and wherein the monolayer of molecules on the surface has no diffusive component that can relocate and destroy amplification accuracy.” Applicants note that this aspect of claim 1 reads nearly identically in the present response.

As a result of the response to the February 4, 2009 Action, the Examiner, in a response dated July 8, 2009, stated that

Applicant's amendments to the claims have overcome all of the previously made rejections, and therefore, they have been withdrawn. The following are new grounds of rejection. (Emphasis added)

The rejections that were withdrawn in response to the above-referenced amendments included the 102 rejection and the three 103 rejections that were also referenced above. The new rejections were a pair of 112 rejections, which Applicants overcame via minor amendments (see Page 2 of the outstanding Office Action).

Consequently, Applicants respectfully submit that the re-application of the previously made 102 and 103 rejections that were, as acknowledged by the Examiner, overcome via Applicant amendment should be reconsidered and those amendments should be withdrawn. Applicants assert that the rejections are re-applied in the present Office Action without any significant alteration to the rejection language and the cited portions of the references are nearly verbatim to the early rejection (that, again, was subsequently withdrawn).

A new citation in the present Office Action is on page 4, where the Examiner states

Church further teaches that the monolayer produced via the disclosed method does not comprise diffusive seed molecules that can relocate and destroy amplification accuracy (column 15, lines 24-36; see also, column 7, lines 3-21...).

Applicants note that column 15, lines 24-36 of Church merely reference "physical limitations on diffusion," which is clearly distinct from the "the monolayer of molecules on the flat surface has no diffusive seed molecules that can relocate" language explicitly included in claim 1. Also, column 7, lines 3-21 of Church describe a process of forming "a replica" that is wholly distinct from the self-completing application process taught in claim 1. Additionally, on column 15, lines 58-60, Church explains that "a replica serves as a master for subsequent steps like step 4, limited by the diffusion of the features and the desired feature resolution." (Emphasis added)

Further, Applicants note that in column 9, lines 32-34 of the Church reference, it is taught that “a molecule that is immobilized at one end can, at most, diffuse the distance of a single molecule length during each round of replication.”

As such, Applicants respectfully submit that the newly-included citation does not teach the noted aspects of claim 1, and further, that re-application of the nearly identical prior art rejections (that were already overcome via amendment and withdrawn) should be reconsidered and once again withdrawn.

In addition, Applicants nonetheless detail and augment some of the noted previously-made arguments below.

Applicants respectfully submit that independent claim 1 is not anticipated by the Church reference because the Church reference does not teach or disclose the claimed aspect of self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer on the flat surface, wherein self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer comprises producing a homogeneous area, wherein the homogeneous area comprises a monolayer of molecules on the flat surface, and wherein the monolayer of molecules on the flat surface has no diffusive seed molecules that can relocate and destroy amplification accuracy.

Beginning on page 4, the Office Action states that

[r]egarding claim 1, Church teaches a method for producing a monolayer of molecules on a surface (see columns 8-15) comprising...

(c) self-completing amplification of the seed molecules via an amplifying reaction to produce the homogeneous area comprising a monolayer of nucleic acids on the flat surface (column 15, line 56 teaches amplification of the transferred seed molecules; see column 13, line 58 - column 14, line 67 for further description of the amplification step).

Applicants respectfully submit that Church does not teach or disclose self-completing amplification, printing to a flat surface, or production of a homogeneous monolayer. As

previously noted, Church discloses techniques using swollen gels as the soft transfer medium (for example, polyacrylamide, cellulose, polyamide (nylon) and cross linked agarose, dextran, and polyethylene glycol). (See, for example, column 9, lines 26-27 ("a semi-solid medium (such as a polyacrylamide gel)"). All such materials require a large fraction of water to be able to adsorb nucleic acids in the matrix. Independent claim 1, however, discloses a transfer medium that cannot be formulated into a gel and which carries the nucleic acids on the surface and not attached to a three-dimensional matrix.

Applicants, as noted above, assert that Church does not teach the limitation of the monolayer of molecules on the surface having no diffusive component that can relocate and destroy amplification accuracy. Applicants point to the specification (for example, at page 14, lines 25-28), wherein it describes that primers are prevented from lateral diffusion through anchors on the source surface as well as on the target surface and also during the self-completing amplification. As taught in claim 1, the self-completing amplification process is performed and without that the primers become diffusible. As such, the techniques can be performed on a flat surface directly exposed to the soluble fraction of the replication mix with no need for a compartmentalization during the replication process.

Additionally, as previously noted by Applicants, self-completing amplification cannot exist in a setting such as taught by Church because the surface in a gel is larger than on a flat surface such that it would not be possible to saturate the gel matrix and run into a self-completion. Also, claim 1 teaches a printing process from a source surface to a target surface, which has a much higher lateral resolution than gel transfer techniques such as taught by Church.

Consequently, Applicants respectfully submit that Church does not teach or suggest all of the limitations of amended claim 1. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Page 5 of the Office Action additionally states that

5 [r]egarding claims 6, 7, 9, and 10, the PCR amplification taught by Church is a directional amplification method that is inherently controlled by the geometry of the seed molecules. The amplification is also controlled by application of an external force, specifically heating (see, for example, columns 13-14). Finally, the nucleic acids amplified by the method of Church are inherently conductive structures....

10 “[r]egarding claim 20, the monolayer produced by Church inherently protects the surface from etchants.

Applicants, as previously noted, respectfully disagree with the above interpretation and note that there are many orders of magnitude between a metal and a long molecule, and as such, Church does not explicitly teach or suggest the limitations of the noted dependent claims.

15 Thus, Applicants respectfully request reconsideration and withdrawal of the 35 U.S.C. §102(b) rejection of independent claim 1, as well as claims 4-7, 9, 10, 14-17 and 20-22 which are dependent therefrom and, as detailed above, are also patentable in their own right.

20 §103 REJECTIONS

As highlighted above, the Examiner rejected claim 8 under 35 U.S.C. §103(a) as allegedly being unpatentable over Church in view of Richter. Specifically, the Examiner, on page 6 of the Office Action, stated that “Church teaches the method of claims 1, 4-7, 9, 10, 14-17 and 20-22, as discussed above.”

25 Applicants respectfully submit that, as detailed above, Church does not teach or suggest every claim limitation of amended independent claim 1. For example, Church does not teach or suggest the limitation of self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer on the flat surface, wherein self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer comprises producing a

homogeneous area, wherein the homogeneous area comprises a monolayer of molecules on the flat surface, and wherein the monolayer of molecules on the flat surface has no diffusive seed molecules that can relocate and destroy amplification accuracy. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Furthermore, if an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Additionally, as previously noted, Applicants respectfully submit that there exists a lack of motivation to combine these two references. By way of example, DNA replicated in a gel (as taught in Church) cannot be metallized in a similar fashion such as taught in Richter. As such, the motivation for one of ordinary skill in the art to combine these two references is lacking.

Consequently, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 8 under 35 U.S.C. §103(a) as being unpatentable over Church in view of Richter.

The Examiner also rejected claims 11 and 13 under 35 U.S.C. §103(a) as allegedly being unpatentable over Church in view of Korlach. Specifically, the Examiner, on page 7 of the Office Action, stated that “Church teaches the method of claims 1, 4-7, 9, 10, 14-17 and 20-22, as discussed above.”

Applicants respectfully reiterate that Church does not teach or suggest every claim limitation of amended independent claim 1. For example, Church does not teach or suggest the limitation of self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer on the flat surface, wherein self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer comprises producing a homogeneous area, wherein the homogeneous area comprises a monolayer of molecules on the flat surface, and wherein the monolayer of molecules on the flat surface has no diffusive seed

molecules that can relocate and destroy amplification accuracy. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Furthermore, if an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Thus, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 11 and 13 under 35 U.S.C. §103(a) as being unpatentable over Church in view of Korlach.

Additionally, as highlighted above, the Examiner additionally rejected claim 12 under 35 U.S.C. §103(a) as allegedly being unpatentable over Church in view of Mian. Specifically, the Examiner, on page 8 of the Office Action, stated that “Church teaches the method of claims 1, 4-7, 9, 10, 14-17 and 20-22, as discussed above.”

Applicants reiterate that Church does not teach or suggest every claim limitation of amended independent claim 1. For example, Church does not teach or suggest the limitation of self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer on the flat surface, wherein self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer comprises producing a homogeneous area, wherein the homogeneous area comprises a monolayer of molecules on the flat surface, and wherein the monolayer of molecules on the flat surface has no diffusive seed molecules that can relocate and destroy amplification accuracy. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Furthermore, if an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Also, on page 8, the Office Action states that

[r]egarding claim 12, the PCR amplification taught by Mian is controlled by application of a magnetic field (see Example 7, column 16, line 50 - column 18, line 9).

Applicants respectfully submit that the Office Action fails to distinguish an electromagnetic field from a magnetic field, which is a significant distinction. As such, one of ordinary skill in the art would not be motivated to combine these two references in order to perform the limitations of claim 12.


Consequently, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 12 under 35 U.S.C. §103(a) as being unpatentable over Church in view of Mian.

Therefore, Applicants submit that all of the pending claims, i.e., claims 1, 4-14, 17 and 20-23, are in condition for allowance, and such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at the telephone number indicated below.

The Examiner's attention to this matter is greatly appreciated.

Respectfully submitted,


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